US007836607B2

(12) **United States Patent**
Kim

(10) **Patent No.: US 7,836,607 B2**
(45) **Date of Patent: Nov. 23, 2010**

(54) **DRUM OF LAUNDRY DRYER**

(75) Inventor: **Chang Wook Kim**, Masan-si (KR)

(73) Assignee: **LG Electronics Inc.**, Seoul (KR)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **10/567,850**

(22) PCT Filed: **May 25, 2005**

(86) PCT No.: **PCT/KR2005/001539**

§ 371 (c)(1),
(2), (4) Date: **Feb. 10, 2006**

(87) PCT Pub. No.: **WO2005/121436**

PCT Pub. Date: **Dec. 22, 2005**

(65) **Prior Publication Data**

US 2007/0068034 A1 Mar. 29, 2007

(30) **Foreign Application Priority Data**

Jun. 5, 2004 (KR) 10-2004-0041111

(51) **Int. Cl.**
F26B 25/00 (2006.01)

(52) **U.S. Cl.** **34/595**; 34/602; 34/603; 34/606; 34/201; 34/218; 34/242; 34/134; 68/142; 165/158; 206/524.8; 62/421; 52/302.1; 8/142

(58) **Field of Classification Search** 34/595, 34/602, 603, 606, 201, 218, 242; 68/142; 165/158; 206/524.8; 62/421; 52/302.1; 8/142

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

857,161	A *	6/1907	Cummer	432/109
1,169,782	A *	2/1916	Eden	68/142
1,364,827	A *	1/1921	Behr	118/301
1,479,864	A *	1/1924	Martin	312/34.13
1,641,554	A *	9/1927	Scott	66/13
1,647,713	A *	11/1927	Olson	192/135
1,655,514	A *	1/1928	Seifert	34/601
1,674,171	A *	6/1928	Gammeter et al.	156/193
1,713,575	A *	5/1929	Warwick	177/1
1,745,707	A *	2/1930	Perrett	137/565.14
1,762,594	A *	6/1930	Seifert	34/606
1,792,137	A *	2/1931	Bethke	366/225
1,914,954	A *	6/1933	Miller	66/43
1,945,890	A *	2/1934	Gaskell	140/112

(Continued)

FOREIGN PATENT DOCUMENTS

DE 4326496 A1 * 2/1995

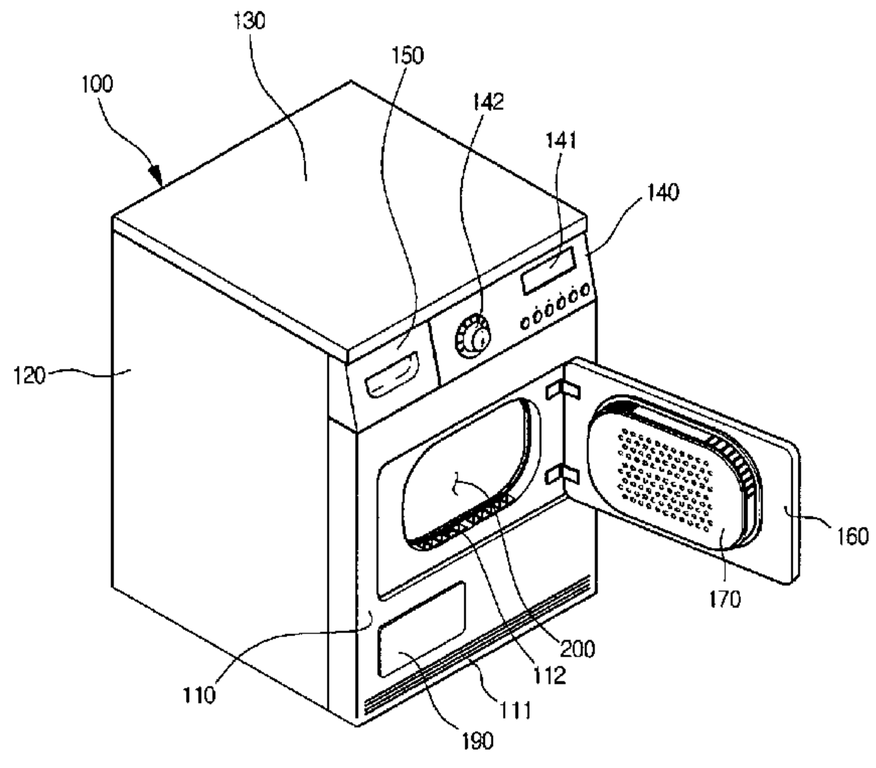
(Continued)

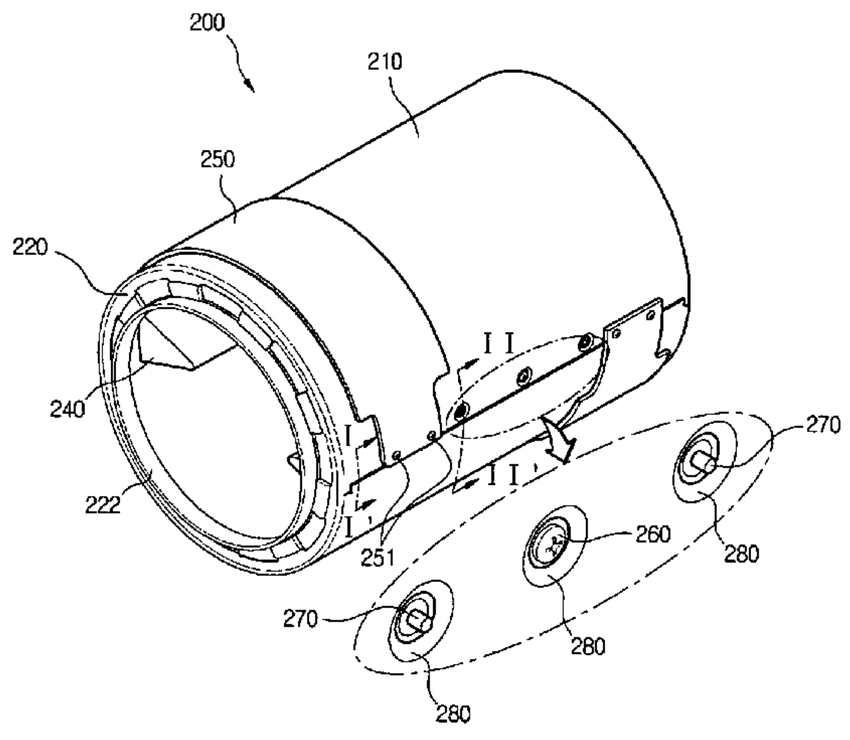
Primary Examiner—Stephen M. Gravini
(74) *Attorney, Agent, or Firm*—McKenna Long & Aldridge LLP

(57) **ABSTRACT**

A drum assembly of a laundry dryer includes a cylindrical drum main body formed through a seam-welding process, a drum head including a main head rim having a predetermined width in a direction toward a center of the drum main body, the main head rim being coupled to a first end of the drum main body and provided with a plurality of elevated portion, and a support sleeve bent from an end of the main head rim, a drum rear wall coupled to a second end of the drum main body and provided with a plurality of hot wind introducing holes, and a lift coupled to an inner circumference of the drum main body to lift the laundry.

12 Claims, 3 Drawing Sheets





U.S. PATENT DOCUMENTS

1,965,480	A *	7/1934	Stramaglia	34/599
2,026,189	A *	12/1935	Purkett	34/601
2,028,078	A *	1/1936	State et al.	156/365
2,078,801	A *	4/1937	Lewis	425/110
2,096,217	A *	10/1937	Vaughan, Jr.	66/36
2,108,084	A *	2/1938	Strobridge	34/610
2,201,068	A *	5/1940	Wintritz	29/410
2,252,181	A *	8/1941	Hunter et al.	34/122
2,262,186	A *	11/1941	Lindberg	34/607
2,297,694	A *	10/1942	Dunham	68/12.19
2,299,458	A *	10/1942	Chandler et al.	242/533.7
2,315,354	A *	3/1943	Shanman	34/82
2,330,421	A *	9/1943	Haberstump	68/144
2,370,120	A *	2/1945	Bousman	210/531
2,372,790	A *	4/1945	Morgenstern	34/609
2,382,843	A *	8/1945	Annis	73/465
2,393,380	A *	1/1946	Jorgenson et al.	34/605
2,413,601	A *	12/1946	Gottlob Bitzer	66/96 W
2,434,886	A *	1/1948	Pugh	34/60
2,451,403	A *	10/1948	Newbery	68/27
2,486,058	A *	10/1949	Patterson et al.	34/82
2,498,172	A *	2/1950	Mintner et al.	432/107
2,521,712	A *	9/1950	Geldhof	34/82
2,539,407	A *	1/1951	Dinley	34/74
2,540,955	A *	2/1951	Moore	34/605
2,547,238	A *	4/1951	Tremblay	34/603
2,553,581	A *	5/1951	Hatfield	68/12.14
2,608,769	A *	9/1952	O'Neil	34/131
2,633,646	A *	4/1953	Smith	34/425
2,642,080	A *	6/1953	Fitzgerald	137/387
2,644,245	A *	7/1953	Hammell et al.	34/547
2,648,142	A *	8/1953	Shapter	34/82
2,673,727	A *	3/1954	Smith	432/107
2,688,806	A *	9/1954	Long	34/75
2,690,660	A *	10/1954	Miller	66/96 R
2,699,660	A *	1/1955	Kirby	68/23.3
2,707,837	A *	5/1955	Paulsen et al.	34/607
2,722,750	A *	11/1955	Smith et al.	34/82
2,722,751	A *	11/1955	Steward	34/82
2,723,331	A *	11/1955	Tyrner	219/137.71
2,728,481	A *	12/1955	Robinson et al.	220/4.02
2,748,496	A *	6/1956	Hellyer	34/603
2,750,782	A *	6/1956	Hamell, Jr.	68/140
2,764,820	A *	10/1956	Kaufman, II	34/79
2,783,549	A *	3/1957	Young	34/83
2,793,444	A *	5/1957	Turner	34/602
2,795,055	A *	6/1957	Huebsch	34/82
2,798,304	A *	7/1957	Reiter	34/91
2,798,306	A *	7/1957	Reiter	34/609
2,802,283	A *	8/1957	Strike	34/87
2,817,501	A *	12/1957	Schubert	366/232
2,827,276	A *	3/1958	Racheter	432/62
2,858,688	A *	11/1958	Smith	68/20
2,864,250	A *	12/1958	Nichols	68/19.1
2,867,107	A *	1/1959	Brown	68/24
2,871,576	A *	2/1959	Ramey	34/87
2,878,662	A *	3/1959	Brucken	68/19.2
2,885,874	A *	5/1959	Polach	66/140 R
2,893,135	A *	7/1959	Smith	34/610
2,925,663	A *	2/1960	Smith	34/75
2,925,665	A *	2/1960	Smith	34/82
2,931,149	A *	4/1960	Mitchell	53/451
2,932,091	A *	4/1960	Day	34/124
2,940,179	A *	6/1960	Czech	34/77
2,958,139	A *	11/1960	Smith	34/604
2,958,140	A *	11/1960	Smith	34/598
2,959,867	A *	11/1960	Doty	34/82
3,000,108	A *	9/1961	Jones et al.	34/607
3,017,758	A *	1/1962	Haverstock et al.	68/19
3,020,648	A *	2/1962	Strike	34/599
3,022,580	A *	2/1962	Doty	34/60
3,022,656	A *	2/1962	Bergeson et al.	68/207
3,029,619	A *	4/1962	Lawson	66/55
3,038,639	A *	6/1962	Anderson	222/651
3,050,974	A *	8/1962	Smith	68/20
3,064,361	A *	11/1962	Turner	34/91
3,066,422	A *	12/1962	Douglas	34/82
3,066,423	A *	12/1962	Solem	34/86
3,084,531	A *	4/1963	Matheny	68/210
3,099,542	A *	7/1963	Van Scoyk	34/554
3,100,978	A *	8/1963	Howlett	68/140
3,116,984	A *	1/1964	Decatur	34/79
3,123,121	A *	3/1964	Katz	152/214
3,125,485	A *	3/1964	Constantine et al.	428/338
3,145,924	A *	8/1964	Rosener	235/60.13
3,151,067	A *	9/1964	Ishoy	210/144
3,177,592	A *	4/1965	Arnfried	34/82
3,228,117	A *	1/1966	Floke	34/126
3,231,909	A *	2/1966	Candor	8/159
3,237,317	A *	3/1966	Heubsch, Sr.	34/599
3,246,673	A *	4/1966	Heinrich	139/1 E
3,246,749	A *	4/1966	Moser	209/17
3,251,448	A *	5/1966	Kienel	194/211
3,281,304	A *	10/1966	Black	156/351
3,318,745	A *	5/1967	Black	156/111
3,320,678	A *	5/1967	Berke	34/82
3,328,897	A *	7/1967	Purkett	34/599
3,333,346	A *	8/1967	Brucken	34/131
3,342,374	A *	9/1967	Kienel	221/215
3,471,940	A *	10/1969	Smith	34/603
3,584,394	A *	6/1971	Grabek	34/599
3,601,903	A *	8/1971	Freze	34/609
3,616,545	A *	11/1971	Jacobs	34/599
3,643,341	A *	2/1972	Magin	34/444
3,721,015	A *	3/1973	Sisler et al.	34/601
3,729,834	A *	5/1973	Fox	34/139
3,811,202	A *	5/1974	Arendt	34/599
3,815,257	A *	6/1974	Freze	34/129
3,815,258	A *	6/1974	Beard, Jr.	34/602
3,816,070	A *	6/1974	Candor et al.	8/158
3,840,998	A *	10/1974	Marcussen	34/128
3,938,357	A *	2/1976	Leib	69/23
3,946,500	A *	3/1976	Barrett et al.	34/139
4,015,930	A *	4/1977	Grantham	432/105
4,065,253	A *	12/1977	Bullock	432/105
4,069,596	A *	1/1978	Sisler	34/242
4,137,645	A *	2/1979	Bullock	34/467
4,204,338	A *	5/1980	Bullock	34/467
4,488,364	A *	12/1984	Herschel	34/86
4,507,080	A *	3/1985	Freze	432/105
4,519,145	A *	5/1985	Mandel	34/389
4,615,125	A *	10/1986	Wyborn	34/92
4,628,617	A *	12/1986	St. Louis	34/108
4,677,760	A *	7/1987	St. Louis	34/90
4,726,125	A *	2/1988	Pellerin	34/82
4,817,298	A *	4/1989	Toma	34/595
4,881,325	A *	11/1989	Jordan et al.	34/60
4,989,347	A *	2/1991	Kretchman	34/607
5,042,171	A *	8/1991	Obata et al.	34/604
5,062,219	A *	11/1991	Harris et al.	34/606
5,074,131	A *	12/1991	Hirose et al.	68/19.2
5,107,606	A *	4/1992	Tsubaki et al.	34/596
5,127,169	A *	7/1992	Ellingson	34/601
5,207,764	A *	5/1993	Akabane et al.	68/20
5,212,969	A *	5/1993	Tsubaki et al.	68/19.2
5,220,734	A *	6/1993	Carver	34/600
5,257,448	A *	11/1993	Pearce et al.	29/434
5,371,956	A	12/1994	St. Louis	
5,403,395	A *	4/1995	McCullough et al.	118/19
5,421,103	A *	6/1995	Wunderlich	34/599
5,433,091	A *	7/1995	Durazzani et al.	68/140
5,438,766	A *	8/1995	Nakamura	34/602
5,463,821	A *	11/1995	Gauer	34/261
D382,684	S *	8/1997	Jackovin	D32/25

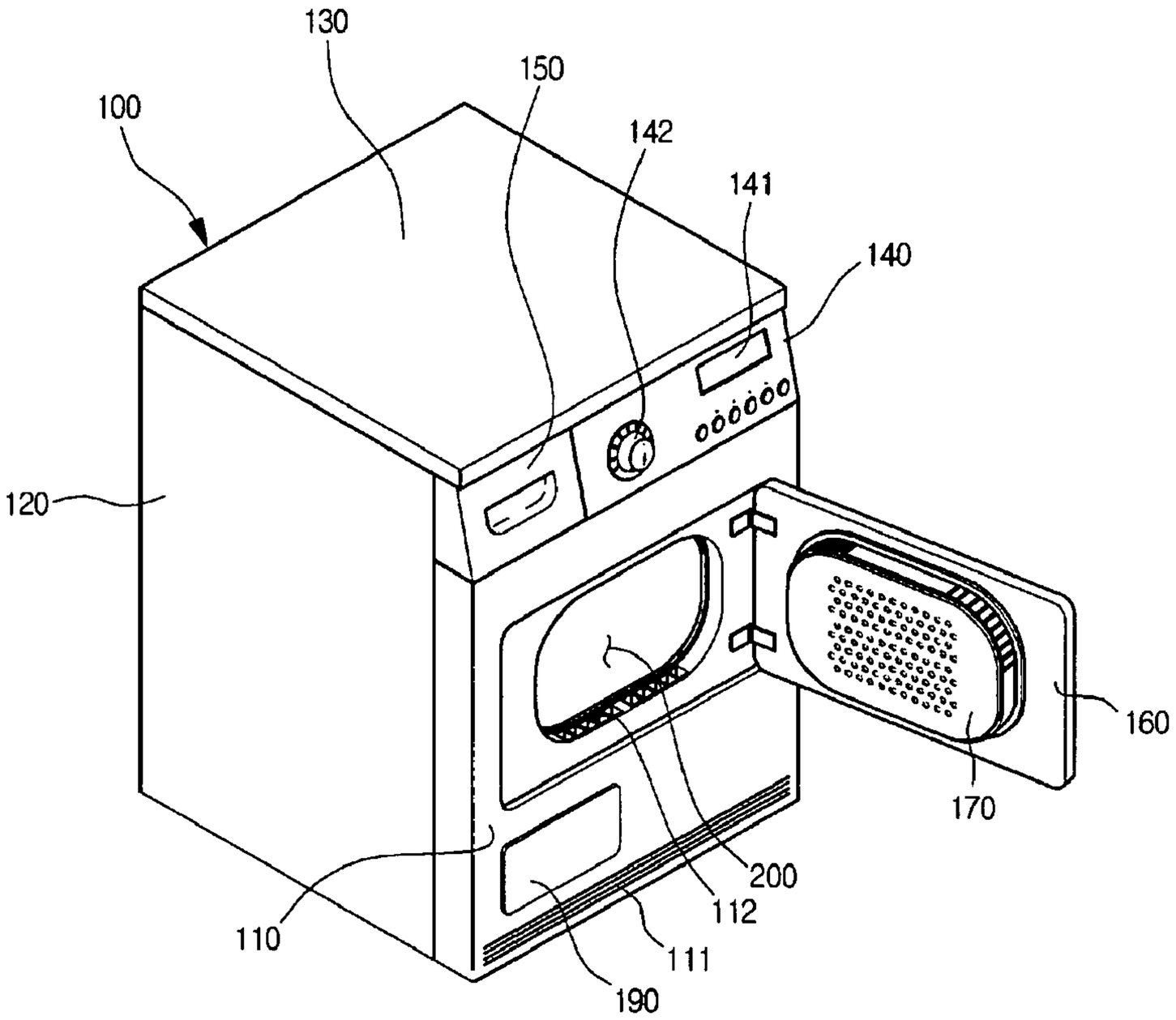
5,706,588	A *	1/1998	Dausch et al.	34/327
5,709,109	A *	1/1998	Cho	68/23.2
5,713,139	A *	2/1998	Briggs	34/602
5,749,163	A *	5/1998	Staub et al.	34/597
5,782,111	A *	7/1998	Sights et al.	68/142
5,802,886	A *	9/1998	Kim	68/142
5,819,437	A *	10/1998	Briggs	34/604
6,067,730	A *	5/2000	Woods	34/603
6,105,533	A *	8/2000	Boos	118/19
6,324,771	B1 *	12/2001	McAllister et al.	34/595
6,381,874	B1 *	5/2002	Floyd	34/602
6,401,362	B1 *	6/2002	Schultz et al.	34/499
6,434,857	B1 *	8/2002	Anderson et al.	34/595
6,698,107	B2 *	3/2004	Song et al.	34/595
6,745,495	B1 *	6/2004	Riddle et al.	34/497
6,751,888	B2 *	6/2004	Lueckenbach	34/595
6,941,679	B1 *	9/2005	Harris et al.	34/596
6,954,992	B2 *	10/2005	Hwang	34/108
6,954,995	B2 *	10/2005	Kitamura et al.	34/597
6,968,632	B2 *	11/2005	Guinibert et al.	34/602
6,995,965	B2 *	2/2006	Hameed et al.	361/91.1
7,007,955	B2 *	3/2006	Cross et al.	277/652
7,024,802	B2 *	4/2006	Myung	34/604
7,036,243	B2 *	5/2006	Doh et al.	34/595
7,055,262	B2 *	6/2006	Goldberg et al.	34/86
7,065,904	B2 *	6/2006	Lee et al.	34/601
7,065,905	B2 *	6/2006	Guinibert et al.	34/603
7,093,377	B2 *	8/2006	Doh et al.	34/596
7,194,824	B2 *	3/2007	Wang	34/602
7,207,124	B2 *	4/2007	Kim	34/601
7,213,348	B2 *	5/2007	Ackermann et al.	34/86
7,225,562	B2 *	6/2007	Guinibert et al.	34/601
7,257,905	B2 *	8/2007	Guinibert et al.	34/82
7,263,787	B2 *	9/2007	Besaw	34/62
7,322,126	B2 *	1/2008	Beaulac	34/554
7,322,127	B2 *	1/2008	Hwang	34/603
7,340,849	B2 *	3/2008	Kim	34/602
7,395,612	B2 *	7/2008	Jeong et al.	34/602
7,395,684	B2 *	7/2008	Ozturk	68/142
7,406,780	B2 *	8/2008	Doh et al.	34/606
7,421,803	B2 *	9/2008	Charron	34/380
7,467,483	B2 *	12/2008	Guinibert et al.	34/601
7,627,960	B2 *	12/2009	Beyerle et al.	34/602
7,661,203	B2 *	2/2010	Fumagalli	34/596
2003/0000106	A1 *	1/2003	Anderson et al.	34/598
2004/0060196	A1 *	4/2004	Lueckenbach	34/595
2004/0103556	A1 *	6/2004	Bang	34/595
2004/0107598	A1 *	6/2004	Hwang	34/601
2004/0111916	A1 *	6/2004	Hwang	34/601
2004/0123486	A1 *	7/2004	Hameed et al.	34/595
2004/0200093	A1 *	10/2004	Wunderlin et al.	34/606
2004/0216326	A1 *	11/2004	Kitamura et al.	34/597
2004/0261288	A1 *	12/2004	Beyerle et al.	34/602
2005/0028400	A1 *	2/2005	Matteson	34/595
2005/0076535	A1 *	4/2005	Guinibert et al.	34/601
2005/0102853	A1 *	5/2005	Wang	34/602
2005/0102854	A1 *	5/2005	Lee et al.	34/602
2005/0115104	A1 *	6/2005	Guinibert et al.	34/601
2005/0120585	A1 *	6/2005	Lee et al.	34/602
2005/0120586	A1 *	6/2005	Hwang et al.	34/603
2005/0126034	A1 *	6/2005	Jeong et al.	34/602
2005/0126035	A1 *	6/2005	Lee et al.	34/602
2005/0132594	A1 *	6/2005	Doh et al.	34/73
2005/0132600	A1 *	6/2005	Myung	34/601
2005/0132604	A1 *	6/2005	Hong et al.	34/603
2005/0166421	A1 *	8/2005	Doh et al.	34/603
2005/0183284	A1 *	8/2005	Hwang et al.	34/603
2006/0130358	A1 *	6/2006	Kim	34/494
2006/0236560	A1 *	10/2006	Doh et al.	34/596
2006/0265899	A1 *	11/2006	Renzo	34/603
2007/0006477	A1 *	1/2007	Guinibert et al.	34/85
2007/0017119	A1 *	1/2007	Besaw	34/602
2007/0074419	A1 *	4/2007	Starrett	34/242
2007/0186440	A1 *	8/2007	Guinibert et al.	34/603
2007/0220776	A1 *	9/2007	Guinibert et al.	34/603
2007/0227031	A1 *	10/2007	Yoon	34/242
2007/0256322	A1 *	11/2007	Kim et al.	34/603
2008/0022551	A1 *	1/2008	Banta et al.	34/602
2008/0022552	A1 *	1/2008	Forget	34/602
2008/0141558	A1 *	6/2008	Bae et al.	34/595
2009/0056161	A1 *	3/2009	Ahn et al.	34/79

FOREIGN PATENT DOCUMENTS

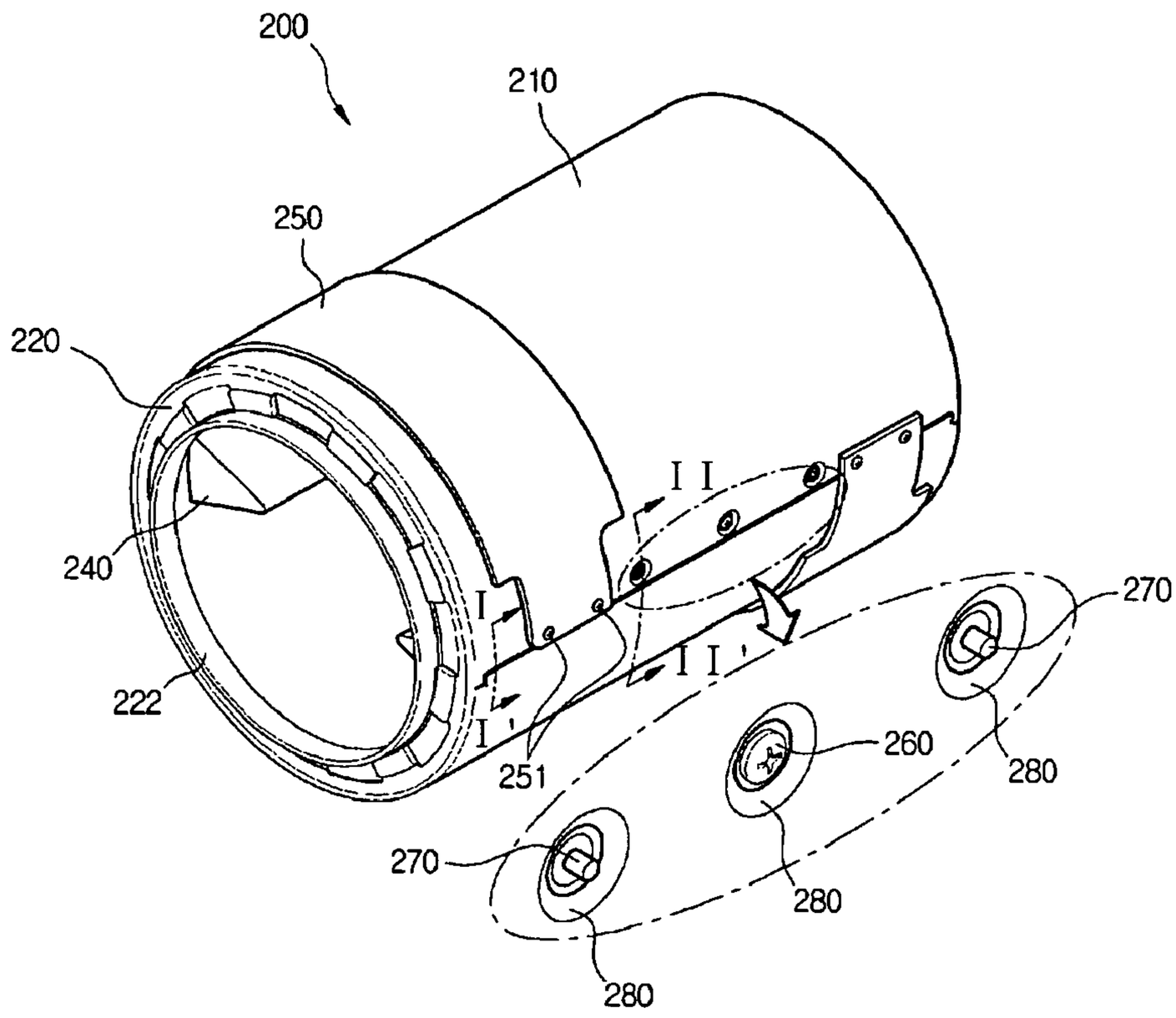
DE	198 21 366		8/1999
EP	600671	A1 *	6/1994
EP	1001068	A1 *	5/2000
EP	1433887	A1 *	6/2004
EP	1433888	A1 *	6/2004
EP	1679400	A1 *	7/2006
EP	1775367	A1 *	4/2007
GB	2063439	A *	6/1981
GB	2063440	A *	6/1981
GB	2063441	A *	6/1981
JP	01249097	A *	10/1989
JP	01249098	A *	10/1989
JP	02-063500		3/1990
JP	02077292	A *	3/1990
JP	02249590	A *	10/1990
JP	02252495	A *	10/1990
JP	03037093	A *	2/1991
JP	03244498	A *	10/1991
JP	04240494	A *	8/1992
JP	04259493	A *	9/1992
JP	04307096	A *	10/1992
JP	05031297	A *	2/1993
JP	05084385	A *	4/1993
JP	05245294	A *	9/1993
JP	06121898	A *	5/1994
JP	06190192	A *	7/1994
JP	07275584	A *	10/1995
JP	07275585	A *	10/1995
JP	07275586	A *	10/1995
JP	08024494	A *	1/1996
JP	08024497	A *	1/1996
JP	08103596	A *	4/1996
JP	08164290	A *	6/1996
JP	08332300	A *	12/1996
JP	09248397	A *	9/1997
JP	10328495	A *	12/1998
JP	11179100	A *	7/1999
JP	2000167294	A *	6/2000
JP	2000300887	A *	10/2000
JP	2003019396	A *	1/2003
JP	2003117286	A *	4/2003
JP	2004209208	A *	7/2004
JP	2005065921	A *	3/2005
JP	2005218610	A *	8/2005
JP	2009077782	A *	4/2009
WO	WO 03/087459		4/2003

* cited by examiner

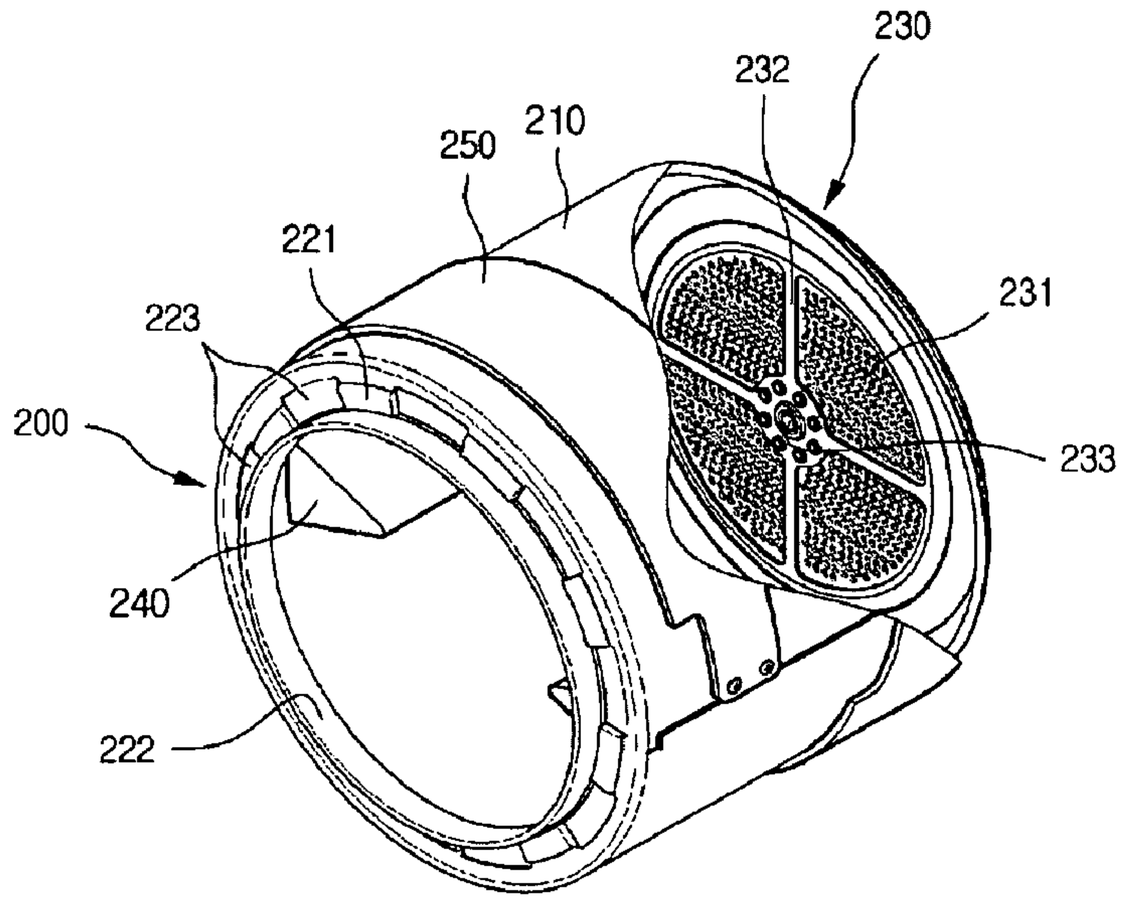
[Fig. 1]


130
150
100
142
141
140
120
160
170
200
112
110
111
190

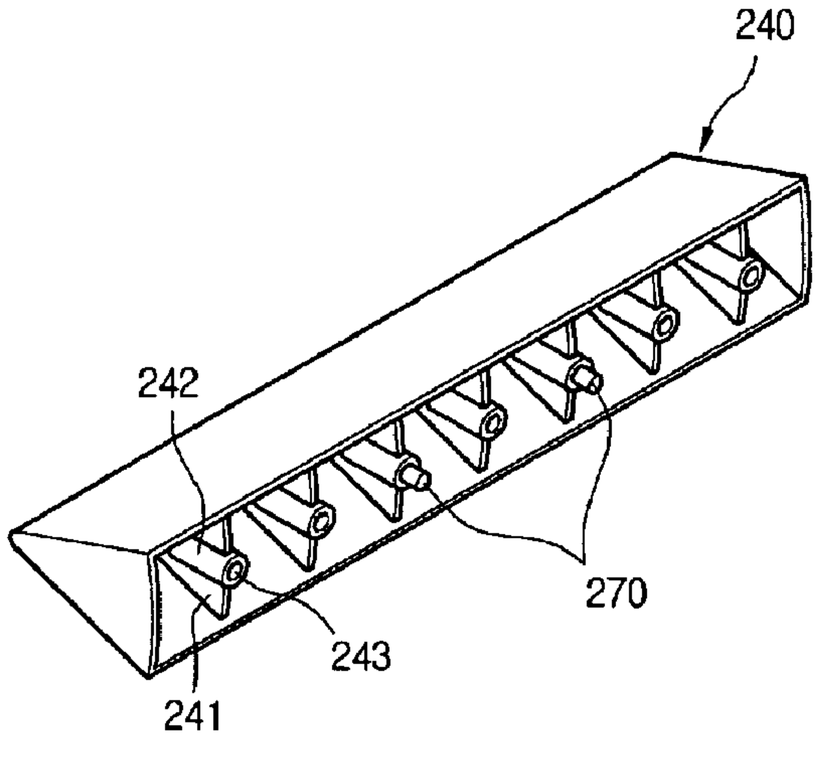
[Fig. 2]


200
210
250
220
240
I I
I
I I'
I '
222
251
270
260
280
270
280
280

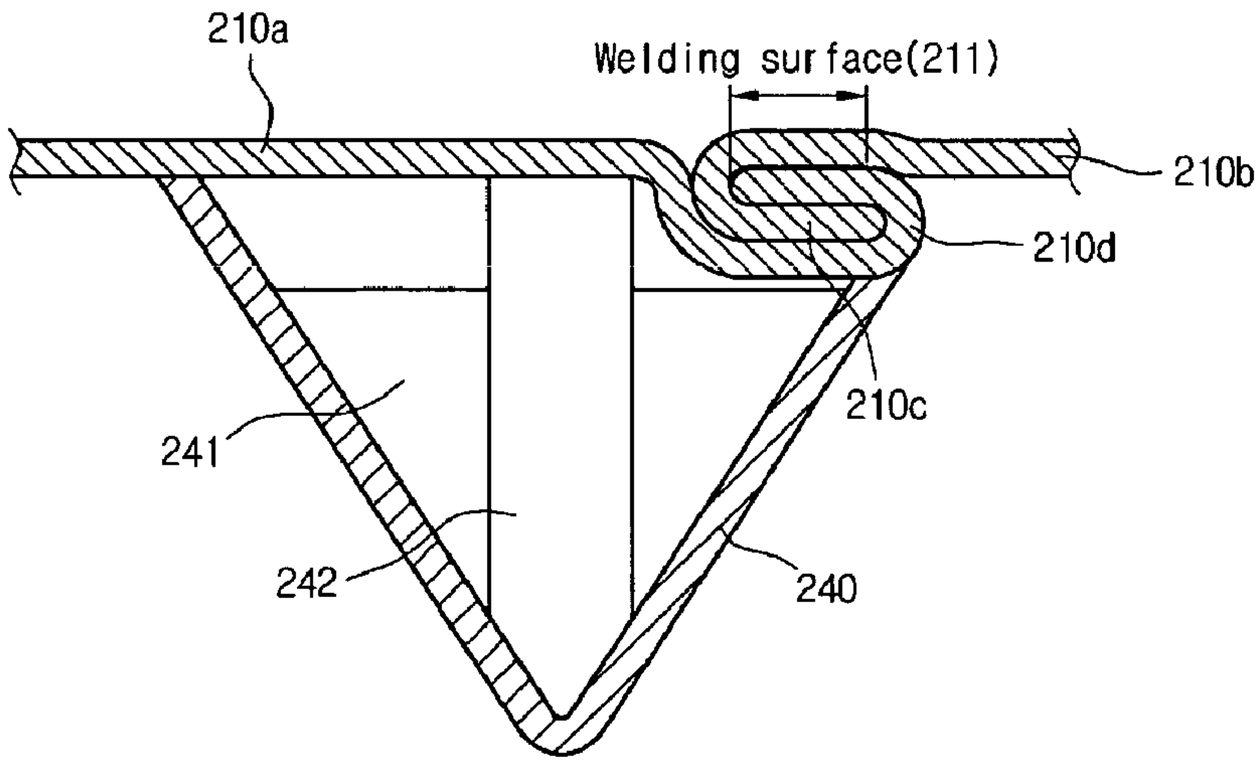
[Fig. 3]



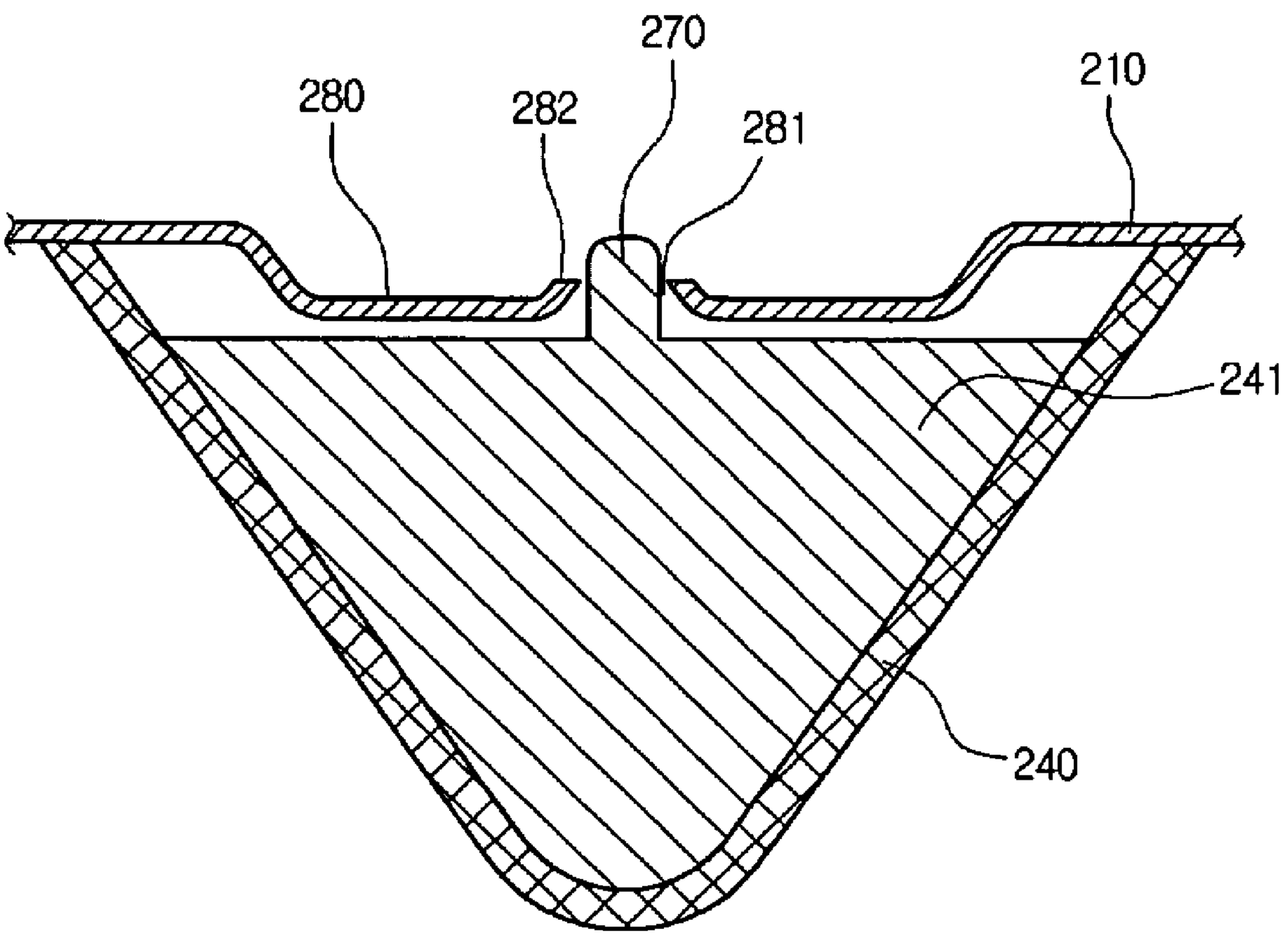
[Fig. 4]



[Fig. 5]



[Fig. 6]



DRUM OF LAUNDRY DRYER

This application claims the benefit of International Application No. PCT/KR2005/001539, filed on May 25, 2005 and Korean Application No. 2004-0041111, filed on Jun. 5, 2004, which are hereby incorporated by reference as if fully set forth herein.

TECHNICAL FIELD

The present invention relates to a laundry dryer, and more particularly, to a drum assembly of a laundry dryer, which can enhance the strength of a drum mounted in the dryer and allow the drum to be assembled to have a flowing outer surface.

BACKGROUND ART

A laundry dryer is an electronic appliance that can dry wet laundry by supplying a high temperature and dry hot wind into a drum in which the wet laundry is stored.

There is an increasing demand for such laundry dryers.

That is, the laundry dryer is designed to dry the laundry using the hot wind while lifting and dropping the laundry loaded in a drum rotating by a driving motor. The laundry dryer may be classified into an exhaust-type dryer and a condenser-type dryer. The former is designed such that high-temperature and humidity air absorbing moisture from the laundry in the drum is exhausted out of the dryer. The latter is designed such that the air circulating in the dryer absorbs the moisture from the laundry loaded in the drum.

In addition, the laundry dryer includes a dry drum in which the wet laundry is loaded and a heater and blower fan for supplying hot wind into the dry drum. A lift is mounted on an inner circumference of the dry drum to lift the laundry loaded in the drum when the dry drum rotates at a high speed. The laundry drum is provided at a front surface with an opening through which the laundry is loaded therein. An inner circumference defining the opening is supported by a front cover defining the front surface of the laundry dryer. The dry drum may be designed such that a rear surface thereof may integrally rotate together with a cylindrical main body of the dry drum. Alternatively, the dry drum may be designed such that the rear surface thereof may be fixed on a back cover so that only the cylindrical main body of the dry drum can rotate alone.

When the dry drum is designed such that the rear surface thereof rotates together with the cylindrical main body of the dry drum, the dry drum is formed by rolling up a single metal plate into a cylindrical shape and welding the metal plate. The front opening of the dry drum is supported on a rear surface of the front cover and the rear surface of the dry drum is supported on a back cover by a journal bearing.

When the dry drum is formed of the single metal plate, there is a problem in that the thickness of the metal plate should be increased to endure the load of the drum at both ends.

In addition, a coupling member is inserted penetrating the dry drum to couple the lift on the inner circumference of the dry drum. At this point, since an outer end of the coupling member is projected from the outer circumference of the dry drum, the projected outer end may interfere with a belt wound around the outer circumference of the dry drum. That is, by the projected outer end, the belt may be damaged or torn up.

In addition, a penetration hole is formed on the dry drum so that the coupling member penetrates therethrough. In this case, by burrs generated during the penetration hole forming process, the coupling member may be easily inserted into the fenestration hole.

Furthermore, the main body of the dry drum is formed by rolling up a rectangular plate and welding opposite ends of the plate. At this point, the welding portion may be projected from the outer circumference of the drum, conflicting with the belt.

DISCLOSURE OF INVENTION

Technical Problem

The present invention has been made in an effort to solve the above-described problems. It is an object of the present invention to provide a drum assembly of a laundry dryer, which can be made by a thin plate and designed to effectively endure the load applied by the drum itself as well as the laundry loaded in the drum.

Another object of the present invention is to provide a drum assembly of a laundry dryer, which can minimize the damage of a belt wound around an outer circumference of the drum by improving a bonding structure of a drum main body.

Another object of the present invention is to provide a drum assembly of a laundry dryer, which is designed to easily mount a lift on an inner circumference of the dry drum and prevent a coupling member coupling the lift on the inner circumference of the dry drum from interfering with the belt.

Technical Solution

To achieve the above objects, the present invention provides a drum assembly of a laundry dryer, comprising: a cylindrical drum main body formed through a seam-welding process; a drum head comprising a main head rim having a predetermined width in a direction toward a center of the drum main body, the main head rim being coupled to a first end of the drum main body and provided with a plurality of elevated portion, and a support sleeve bent from an end of the main head rim; a drum rear wall coupled to a second end of the drum main body and provided with a plurality of hot wind introducing holes; and a lift coupled to an inner circumference of the drum main body to lift the laundry.

According to another aspect of the present invention, there is provided a drum assembly of a laundry dryer, comprising: a cylindrical drum main body provided with at least one coupling hole; a drum head coupled to a first end of the drum main body; a drum rear wall coupled to a second end of the drum main body; and a lift mounted on an inner circumference of the drum main body and provided at a bottom surface with positioning projection inserted in the coupling hole and with a boss in which a coupling member is inserted.

Advantageous Effects

According to the inventive drum assembly of the present invention, since the dry drum is formed of three parts, i.e., a drum head, a drum main body and a drum rear wall, a thickness of the drum, which is required for supporting the load of the drum and the laundry, can be reduced.

In addition, since the drum head of the dry drum is embossed to enhance the strength, more laundry can be loaded in the drum.

Furthermore, since the welding portion formed on an outer surface of the dry drum main body is depressed inward of the drum, the outer circumference of the dry drum can be smoothly formed, thereby preventing the welding portion from conflicting with the belt.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an outer perspective view of a laundry dryer where a drum assembly of the present invention is employed;

FIG. **2** is an outer perspective view of a drum assembly according to one embodiment of the present invention;

FIG. **3** is a partly broken perspective view of a drum depicted in FIG. **2**;

FIG. **4** is a perspective view of a lift according to one embodiment of the present invention;

FIG. **5** is a sectional view taken along lines I-I' of FIG. **1**; and

FIG. **6** is a sectional view taken along lines II-II' of FIG. **2**.

BEST MODE FOR CARRYING OUT THE INVENTION

Reference will now be made in detail to the preferred embodiments of the present invention. It is to be understood that the following detailed description of the present invention does not limit the present invention but various modifications and variations can be made in the present invention. Thus, it is intended that the present invention covers the modifications and variations of this invention provided they come within the scope of the present invention.

FIG. **1** is an outer perspective view of a laundry dryer where a drum assembly of the present invention is employed.

Referring to FIG. **1**, a laundry dryer **100** with the inventive drum assembly includes a front cover **110** defining an outer appearance of the dryer **100**, side and top covers **120** and **130**, and a control panel disposed on an upper portion of the front cover and having a dial knob **142** for inputting a drying condition and a display unit **141**.

A drawer **150** for storing condensed water generated during the drying process is inserted in a portion of the control panel **140**. The front cover **110** is provided at a center with an opening. A door **160** is pivotally mounted on the front surface of the front cover **110** to open and close the opening of the front cover **110**. A door lint filter **170** is mounted on a rear surface of the door **160** to filter foreign objects such as naps generated during the drying process. A body lint filter **112** is formed on a lower end of the opening, which contacts a lower end of the door lint filter **170**.

The dryer **100** includes a drum **200** received therein, a condenser receiving portion **180** formed on a lower portion of the front cover **110**, and a suction grill **111** formed on the lower portion of the front cover **110** under the condenser receiving portion **180**.

Describing the operation of the above-described dryer **100**, a belt (not shown) is wound around the outer circumference of the drum **200** and connected to a motor (not shown) mounted under the drum **200**. Therefore, when the motor is driven, the drum **200** rotates. As the drum **200** rotates, the laundry **200** in the drum is repeatedly lifted to the highest point and fallen. The high-temperature/dry air introduced through the rear wall of the drum **200** absorbs the moisture contained in the laundry.

Meanwhile, the air changed into the high-temperature/damp air by absorbing the moisture from the laundry passes through the door lint filter **170** and the body lint filter **112**, in the course of which foreign objects contained in the air are filtered. Then, the high-temperature/damp air passes through the condenser (not shown) to be changed into condensed water. The condensed water is collected in the drawer **150**.

FIG. **2** is an outer perspective view of a drum assembly according to one embodiment of the present invention.

Referring to FIGS. **2** and **3**, the drum includes a drum main body **210** formed by rolling up a rectangular plate in a cylindrical shape and bonding opposite ends of the plate, a drum head **220** attached on a first end of the drum main body **210**, and a drum rear wall **230** attached on a second end of the drum main body **210**.

The drum main body **210** is formed in the cylindrical shape through the seaming process. The drum head **220** and the drum rear wall **230** are also coupled to the first and second ends of the drum main body **210** through the seaming process, respectively. The coupling process of the drum head **220** and the drum rear wall **230** to the drum main body **210** is not limited to the seaming process. That is, a variety of other welding methods can be used. The coupling process of the drum main body **210** will be described later.

At least one lift **240** is mounted on the inner circumference of the drum main body **210**. The lift **240** is fixed on the inner circumference of the drum main body **200** by a coupling member **260** penetrating into the drum main body **210** from the outer surface of the drum main body **210**. A positioning projection **270** formed on a bottom surface of the lift **240** penetrates the drum main body **210** so that the lift **240** can be positioned on the right location on the drum main body **210**.

In addition, at least one soundproofing belt **250** is attached on the outer circumference of the drum main body **210** to attenuate noise generated when hard objects such as coins collides with the drum. The soundproofing belt **250** is coupled to the drum main body **210** by a coupling member **251**. The coupling method of the soundproofing belt **250** is not limited to this. For example, a double-sided tape or adhesive may be used.

The drum main body **210** is provided with a penetration hole through which the positioning projection **270** is inserted. The penetration hole is depressed by a predetermined depth from the outer circumference of the drum main body **210**. That is, a circular-shaped conflicting prevention groove **280** is formed around the penetration hole so that the position projection **270** cannot be projected from the outer circumference of the drum main body **210** even when the position projection **270** penetrates the penetration hole. Another conflicting prevention groove **280** is formed on the outer circumference of the drum main body **210** between the positioning projections **270** at a center of which a penetration hole is formed. The coupling member **260** is inserted through the penetration hole to couple the lift **240** to the inner circumference of the drum main body. In this case, since the conflicting prevention groove **280** is depressed by a predetermined depth, a head portion of the coupling member **260** is not projected, thereby not conflicting with the belt wound around the outer circumference of the drum **200**. The structure of the lift will be described with reference to the accompanying drawings later.

In addition, the drum head **220** is formed in a circular strip having a predetermined width. An outer edge of the drum head **220** is coupled to the first end of the drum main body **210**. The drum head **220** includes a main head rim **221** formed extending inward from the drum main body **210** and having a predetermined width and a front support sleeve **222** bent from an end of the main head rim **221** in parallel with a central axis of the drum **200**. That is, the main head rim **221** and the front support sleeve **22** are disposed to be perpendicular to each other.

Namely, the front support sleeve **222** is disposed on an outer circumference of a drum support (not shown) mounted on a rear surface of the front cover **110**. The drum support is provided with a circular projection having a diameter identical to an inner diameter of the front support sleeve **222** so that the front support sleeve **22** rotates in a state where it is inserted

around the outer circumference of the circular projection. A friction preventing member such as a pelt is disposed around the outer circumference of the circular projection to minimize the frictional heat generated when the front support sleeve **222** contacts the circular projection.

In addition, a diameter of the front support sleeve **222** is less than a diameter of the drum main body **210**. Therefore, the loads of the drum **200** and laundry loaded in the drum **200** is transmitted through the main head rim **221**.

The main head rim **221** is provided with at least one elevated portion **223** formed through a forming process. Preferably, the elevated portion **223** is provided in plurality that are arranged at a predetermined distance from each other.

Since the loads of the drum main body **210** and the laundry is concentrated on the main head rim **221**, the loads applied to the main head rim **221** are uniformly distributed. The elevated portion **223** are formed to enhance the strength of the main head rim **221**. Therefore, a thickness of the main head rim **221** can be reduced as compared with a case it is formed without the elevated portion **223**.

Meanwhile, the drum rear wall **230** is provided with a plurality of hot wind introducing holes **231**. The high-temperature/dry air is introduced from a dry duct (not shown) into the drum **20** through the hot wind introducing holes **231**. A journal bearing **233** for supporting the load of the drum **200** is rotatably mounted on a center portion of the drum rear wall **230**. A distal end of the journal bearing **233** is supported by a back cover (not shown) of the dryer **100**. The hot wind introducing holes **231** may cause the strength of the drum rear wall **230** to be weakened, thereby deforming the drum rear wall **230**. To solve this problem, the strength reinforcing embossments **232** are formed on the drum rear wall **230** and arranged in a radial direction from the center portion thereof. The embossments **232** function to distribute the loads concentrated on the journal bearing **233**.

FIG. **4** is a perspective view of a lift according to an embodiment of the present invention.

Referring to FIG. **1**, as described above, the lift **240** is mounted on the inner circumference of the drum **200** to be in parallel with a central axis of the drum **200**.

The lift **240** is designed having a triangular section and mounted on the inner circumference of the drum **200** such that a peak of thereof is oriented toward the central axis of the drum.

A plurality of strength reinforcing ribs **241** are arranged in the lift **240** and spaced from each other by a predetermined distance. A boss **242** in which the coupling member is inserted is formed on a center of each rib **241**. The boss **242** is provided at a center with an insertion hole **243** in which the coupling member can be inserted.

In addition, some of the bosses **242** are provided at there front ends with the respective positioning projections **270** that will be inserted into the penetration holes formed on the drum main body **210**.

By the coupling bosses penetrating the drum main body **210** and inserted into the insertion holes **242** of the bosses **242**, the lift **240** is fixed on the inner circumference of the drum **200**. Before the coupling members are inserted in the insertion holes **243**, the location of the lift **240** is determined by the position projections **270**.

FIG. **5** is a sectional view taken along line I-I' of FIG. **1**.

Referring to FIG. **5**, opposite circumferential ends of the drum main body **210** are bonded each other by a seam-welding process.

That is, the seam-welding is one of electric resistance welding methods, which performs the point-welding using a roller type electrode. This seal-welding is very effect for forming a seam requiring airtightness and watertightness.

Describing the seal-welding process, first and second circumferential end portions **210***a* and **210***b* of the drum main body **210** contact each other to form a welding surface **211** having a predetermined width. The roller type electrode depresses the outer surface of the joint portion between the first and second circumferential end portions **210***a* and **210***b* of the drum main body **210**.

Here, the second circumferential end portion **210***b* of the drum main body **210** is provided with a folded end **210***c* that is located over the first end portion **210***a* of the drum main body **210** by a predetermined length. That is, the first end portion **210***a* closely contacts a portion distant from an extreme end of the second end portion **210***b* at a predetermined interval. The folded end **210***c* is folded as in the drawing. The welding portion is folded such that a folded end **210***c* closely contacts the first end portion **210***a* with reference to a bent end **210***d* of the first end portion **210***a* of the drum main body **210**. Here, the bent end **210***d* is a point where an extreme end of a folded end **210***c* contacts the first end portion **210***a*.

According to a feature of the present invention, the welding portion including the folded end **210***c* of the drum main body **210** is depressed into the drum **200** through the seam-welding process. Thus, the outer circumference of the drum **200** can be smoothly processed without any protruded portion. As a result, the belt wound around the outer circumference of the drum **200** is not damaged when the drum rotates. The welding portion depressed into the drum **200** is covered by the lift **240**, no laundry is caught by the welding portion, thereby preventing the laundry from being damaged.

FIG. **6** is a sectional view taken along line II-II' of FIG. **2**.

Referring to FIG. **6**, the lift is mounted on the inner circumference of the drum **200**. As the drum **200** rotates, the laundry **200** in the drum **200** is repeatedly lifted to the highest point and fallen.

As described above, the lift **240** is designed having a triangular section and, as shown in the drawing, at least one positioning projection **270**. Between the positioning projections, the boss (refer to the reference numeral **242** of FIG. **4**) in which the coupling member **260** is inserted is formed. The strength reinforcing rib **241** is formed on each outer circumference of the positioning projection **270** and the boss **242** so as to prevent the projection **270** and the boss **242** are not inclined to a side.

The drum main body **210** is provided with the conflicting prevention groove **280** having a predetermined diameter is formed. The conflicting prevention groove **280** is provided at a center with the penetration hole **281** in which the positioning projection **270** is inserted. That is, the positioning projection **270** is inserted into the penetration hole **281** formed on the drum main body **210**. Describing in more detail, the conflicting prevention groove **280** is slightly depressed from the surface of the drum main body **210** to prevent the positioning projection **270** from interfering with the belt wound around the outer circumference of the drum **200**.

A bent portion **282** is formed on an inner circumference defining the penetration hole **281**. The bent potion **282** is bent in a direction where the positioning projection **270** is inserted into the penetration hole **281** from the inner circumference to the outer circumference.

Generally, when a work piece is cut of by, for example, sawing, burrs are generated on the processed surface. Such burrs are also generated on the inner circumference of a hole during a punching process. When the burrs are formed on the penetration hole, it becomes difficult to insert the coupling member into the penetration hole.

To solve this problem, in the present invention, the bent end **282** defining the penetration hole **281** is designed to be bent outward so that the positioning projection **270** can be smoothly inserted through the penetration hole **281** without conflicting therewith.

Meanwhile, the height of the bent end **282** is set to be lower than a depth of the groove **280** so as to prevent the belt wound around the outer circumference of the drum **200** from being damaged by the bent end **281**.

INDUSTRIAL APPLICABILITY

According to the inventive drum assembly, since a thickness of the drum can be reduced, the manufacturing costs can be saved. In addition, since the rotational belt wound around the outer circumference of the drum is not damaged by the coupling member or positioning projection, the endurance of the product can be improved. Therefore, the inventive drum assembly has a very high industrial applicability.

The invention claimed is:

1. A drum assembly of a laundry dryer, comprising:

a cylindrical drum main body that is formed through a seam-welding process, the seam-weld being located only on the cylindrical portion of the drum main body;

a drum head comprising a main head rim having a predetermined width in a direction toward a rotating shaft of the drum main body, the main head rim being coupled to a first end of the drum main body and provided with a plurality of elevated portions, and a support sleeve bent outwards from an end of the main head rim;

a drum rear wall coupled to a second end of the drum main body and provided with a plurality of hot wind introducing holes; and

a lift coupled to an inner circumference of the drum main body to lift the laundry,

wherein the cylindrical portion is provided with at least one penetration hole that is a predetermined distance apart from the first end and the second end of the drum main body, and

wherein the lift is provided at a bottom surface with a positioning projection to be inserted into the penetration hole.

2. The drum assembly according to claim **1**, wherein the elevated portion is formed through a forming process.

3. The drum assembly according to claim **1**, wherein the drum main body is provided with a welding portion that is depressed into the drum main body to smoothly form the outer circumference of the drum main body.

4. The drum assembly according to claim **1**, wherein a portion where the penetration hole is formed is depressed from an outer circumference of the drum main body.

5. The drum assembly according to claim **1**, wherein the drum main body, the drum head and the drum rear wall are coupled to each other through a seam-welding process.

6. The drum assembly according to claim **1**, wherein an inner circumference defining the penetration hole in which the positioning projection is inserted is bent outward of the drum main body.

7. The drum assembly according to claim **1**, wherein a portion where the penetration hole is formed is depressed to define a conflicting prevention groove.

8. The drum assembly according to claim **7**, wherein a length of the positioning projection passing through the penetration hole is equal to or less than a depth of the conflicting prevention groove.

9. The drum assembly according to claim **1**, wherein an extreme end of the positioning projection passing through the penetration hole is located to be lower than an outer circumference of the drum main body.

10. The drum assembly according to claim **1**, wherein the lift is fixed on the drum main body by a coupling member penetrating the coupling hole and inserted in a boss, the boss being provided in the inside of the lift.

11. The drum assembly according to claim **10**, wherein a head portion of the coupling member is located to be lower than an outer circumference of the drum main body.

12. The drum assembly according to claim **1**, wherein the plurality of elevated portions are positioned perpendicular to the support sleeve.

* * * * *